

Robotics Mid Sem

5. Yes

6. Yes

7. Yes

8. Yes

9. Yes

For end sem:

2. A. Soft gripper is more suitable and has many advantages than a hard gripper. Pills come in different sizes and shapes, also their orientation in the bottle is not fixed so it will be very difficult for a hard gripper to make a good grip on every pill. To hold the pill, the gripper has to apply some force that can damage the pill (especially capsules). We can make use of soft robotics to design the gripper as many soft robotic grippers are available today. The soft material of the gripper increases grip by providing more area of contact, so we have to apply less force on the pill. It is very easy to fit sensors in a soft robotic gripper.

B.

Flexible mechanisms: In this mechanism, links can deform according to our needs.

<https://www.youtube.com/watch?v=S4o6-wXmwaQ>

Soft robotic grippers: As discussed in 2.a, it can change shapes but the material used in this is different from flexible mechanisms.

<https://www.youtube.com/watch?v=X0XGure7mak>

Paper Gripper: these can be made from paper by cutting it in a specific way. But its size increases with the weight of the objects.

<https://www.youtube.com/watch?v=UerxNyu147g>

Origami robots: these robots are made from folding paper.

<https://www.youtube.com/watch?v=zfU6KPzmNUU>

3a.

Hip to Knee distance = 43

Knee to ankle distance = 47

Gait analysis is a study of the movement of the human leg that how a person walks or run. A gait cycle starts with one leg and ends with the same leg when it touches the ground for the first time (2 steps).

Step Length: the distance covered in a step. We can calculate the average step length for a long walk, Average step length = distance travelled/no. of steps. This is more accurate than a single step measurement.

Step Height: step height is the maximum heel height in a step.

4a.

Link length = 1

Single revolute joint and single link

DH parameter:

| a | α | d | θ |
|---|----------|---|----------|
| 1 | 0 | 0 | θ |